Health Consultation

Public Health Review of the Addendum to the Quality Assurance Project Plan
Concerning Interior Sampling

HERCULANEUM LEAD SMELTER SITE

HERCULANEUM, JEFFERSON COUNTY, MISSOURI

EPA FACILITY ID: MOD006266373

AUGUST 6, 2002

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

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Prepared by:

Missouri Department of Health and Senior Services
Section for Environmental Public Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Statement of Issues and Background

Statement of Issues

The U.S. Environmental Protection Agency (EPA) asked the Missouri Department of Health and Senior Services (DHSS) and the Agency for Toxic Substances and Disease Registry (ATSDR) to review the Addendum to the Quality Assurance Project Plan (QAPP) for the Herculaneum Lead Smelter Site. This QAPP addendum addresses screening/sampling of home interiors at which removal activities have already taken place to assess the potential for recontamination due to on-going operations at the site. This health consultation responds to EPA's request.

Background

The Herculaneum lead smelter is an active facility that has been in operation in this community since 1892. The Doe Run Company currently owns and operates the smelter. The facility is located at 881 Main Street in Herculaneum, Missouri, approximately 25 miles south of St. Louis, Missouri, on the Mississippi River. A lead ore concentrate, consisting of approximately 80% lead sulfide, is processed at the smelter. The ore is transported by truck from the company's eight lead mines near Viburnum, Missouri, approximately 75 miles south-southwest of Herculaneum. The 52-acre Herculaneum facility consists of a smelter plant, 24-acre waste slag storage pile, and an onsite sulfuric acid plant (1). Figures 1 and 2 identify the location of the smelter in the community (2).

Environmental sampling has shown lead contamination throughout the community and high prevalence rates of elevated blood lead levels in children less than 72 months of age (3). Several exposure reduction activities have been implemented including smelter emission and fugitive dust reductions, soil yard replacements, and in-house dust removals (4).

Because smelting operations will continue at the site after the exposure reduction activities have been completed, the potential exists for on-going lead emissions to redeposit throughout the community. In response to this potential redeposition, EPA has developed a plan to assess recontamination of home interiors over an anticipated 12-month period (5). According the QAPP addendum, sampling of 15-20 homes will generate a data set statistically representative of the area with a 90% confidence level (5). This plan consists of the following basic elements:

- Twenty homes will be chosen according to the following criteria:
    - All residences with children who have blood lead levels of 10 micrograms per deciliter or greater,
    - Remaining residences to be sampled will be based on the following:
        - Residences with children under six years of age,

- Statistical representativeness of the area to address the recontamination issue, and
- Access granted by homeowner.

- Dust wipe samples will be taken from 20 residences that have undergone interior cleaning. Five wipe samples will be taken on a monthly basis from non-porous surfaces. This will typically include three floors and two window sills in each home. If young children are present in the home, efforts will be made to take these samples from common areas used by the children and from the children's bedrooms. These samples will be analyzed for arsenic, cadmium, lead, nickel and zinc loading levels. Loading levels give the weight of a metal per unit area (e.g., micrograms per square foot). Samples will be collected according to procedures in the EPA *Residential Sampling for Lead: Protocols for Dust and Soil Sampling – Final Report* and analyzed per EPA method 6020.

- Dust wipe samples will be taken from five vehicles chosen from the 20 residences. These samples will be from the dash-board of the vehicle. These wipes will be analyzed for the same parameters as the residential interior dust wipes. The same sampling and collection methods mentioned for the residential dust wipe samples above will be employed.

- Dust vacuum samples will be taken from the 20 residences. One dust sample will be taken from a carpeted floor in each home each month. The sample will be taken from a high traffic area. These samples will be analyzed for arsenic, cadmium, lead, nickel and zinc concentration (milligrams metal per gram of dust) and loading levels (milligrams of metal per area sampled). Samples will be collected according to procedures in Region 7 Standard Operating Procedure (SOP) 4231.11A (modified to incorporate the use of a HEPA vacuum) and analyzed per EPA method 6020.

- Dust vacuum samples will be taken from five vehicles chosen from the 20 residences. These samples will be from the carpeted portion of the driver's side floorboard adjacent to a rubber or vinyl floormat, if present. These samples will be analyzed for arsenic, cadmium, lead, nickel and zinc concentration and loading levels. The same sampling and collection methods mentioned for the residential dust samples above will be employed.

- Carpet swatch samples will be collected from five of the 20 residences. These residences will be chosen after review of the dust sampling data generated during the initial sampling event. Two samples will be taken from each of the homes. A one square inch sample will be taken from both a high traffic area and a low traffic area. Sampling locations will be selected in smaller areas/rooms within each residence, such as a hallway or a child's bedroom. After the samples are taken, the carpeting in

these rooms/areas will be removed and the underlayment cleaned by a licensed lead abatement contractor prior to the installation of new carpeting in these rooms/areas. Carpet samples will be analyzed for arsenic, cadmium, lead, nickel and zinc concentration and loading levels per EPA method 6020. No SOP was given for the carpet sampling.

- Lead-based paint screening will be completed in all 20 homes using an X-ray fluorescence spectrometer. This screening will be performed on painted surfaces in each room of the residence and will follow the protocol established by the U.S. Department of Housing and Urban Development *Guidelines for the Evaluation and Control of Lead-based Paint Hazards in Housing* (5).

Discussion

Pathways of exposure to metals in Herculaneum homes are incidental ingestion of dust and inhalation of air and dust for the past and present, with the potential for similar exposure pathways in the future.

In general, the QAPP addendum contains elements which should allow for the recontamination assessment of home interiors. There are, however, several details which have not been adequately addressed. These include:

1. Priority is given to sampling homes within the area in which the owners have already been offered a voluntary buy-out. The addendum is not clear as to whether it will still include sampling of homes where children lived prior to the buy-out, but have since vacated. Only homes that are occupied should be included in the sampling. This will account for the impact of daily movement in the house on dust levels.

2. The addendum states that "All residences with children with known elevated blood levels for lead will be sampled." The text should be clarified to indicate whether this applies to any children, regardless of age, or only those children less than 72 months of age.

3. Not enough information is given regarding how 20 homes are representative of the area to be sampled.

4. Regarding dust wipe sampling, the plan is not clear as to whether the same five areas will be sampled each month. For the purposes of recontamination assessment, adjacent areas should be sampled.

5. Regarding interior sampling of vehicles, there is inadequate information about which homes will have vehicles sampled and which vehicles will be sampled. The plan should

be more specific regarding these issues -- will the vehicles be chosen at random or on likelihood of exposure?

6. The purpose of sampling the vehicle interiors is not clear. Is this being done to evaluate exposure from inside the vehicles or to extrapolate recontamination of residential interiors from vehicles?

7. For the purposes of determining recontamination, the use of a dust sample from a high traffic area is appropriate. Nevertheless, being a high traffic area alone might not be adequate to assess exposure. If possible, the sample should be taken from a high traffic area that is also an area where young children could have a greater potential for exposure (e.g., areas where the child plays or eats on the floor). The analysis for concentration and surface loading will be essential for determining public health impact of the levels found.

8. Regarding carpet sampling, the basis for selecting only five homes is unclear. Furthermore, there is no discussion of how these five homes will be chosen. DHSS cannot determine whether five homes is representative of the area and will adequately determine recontamination.

9. During carpet removal, appropriate actions need to occur to assure that dust entrained in and below the carpeting and padding is not disseminated throughout the house.

10. As carpets are removed, sampling of dust between the floor and padding or carpet would help to assess exposure potentials for other individuals in the community who could remove their carpet individually.

11. The lead-based paint assessment is appropriate for public health interpretation.

12. The addendum does not state what criteria will be used to determine if lead levels in the various samples are of a public health concern

Conclusions

1. The QAPP addendum contains sampling that should assist in determining lead recontamination of interiors. Still, there are some gaps in the plan which need to be filled. These include:

   - Issues with how the number of homes for each type of sampling was determined and what assurances there are that the homes/vehicles chosen for sampling will be representative of the area,
   - Issues regarding whether all the homes included in the sampling will be inhabited,
   - Clarification on locations of dust wipe and vacuum sampling in homes,
   - Rationale for vehicle interior sampling, and

- Assurances that carpet removals will not disseminate lead-contaminated dust in the homes.

2. Some minor changes to this plan could lead to analytical results that not only assess recontamination, but could also assist in assessing exposure.

3. A contingency plan to address necessary actions should interior lead dust levels increase to a level of public health concern over the 12-month period is not presented in the addendum.

Recommendations

1. Gaps identified in the addendum should be filled.

2. Assure carpet removal does not release lead from or below the carpet into the residence.

3. Develop a contingency plan for actions that would be necessary should interior lead dust levels increase to a level of health concern over the 12-month sampling period.

4. Collect dust samples from an area that combines high traffic and greater child exposure potential.

5. When removing carpet, consider collecting samples of dust between the floor and padding or carpet.

Public Health Action Plan

The Public Health Action Plan (PHAP) for the Herculaneum Lead Smelter site contains a description of actions to be taken by the Missouri Department of Health and Senior Services (DHSS), the Agency for Toxic Substances and Disease Registry (ATSDR), and other involved parties. The purpose of the PHAP is to ensure that this health consultation not only identifies public health hazards, but provides an action plan to mitigate and prevent adverse human health effects resulting from past, present, and future exposures to contamination from the site. Included is a commitment from DHSS, ATSDR, or both to follow up on this plan to ensure that it is implemented.

1. DHSS/ATSDR will cooperate with the EPA to assure gaps in the current plan are addressed.

2. EPA will take appropriate precautions to control lead dust during carpet removal.

3. EPA will develop a contingency plan for necessary activities should interior lead dust levels rise to a level of public health concern.

4. DHSS/ATSDR will work with EPA to evaluate revision of the addendum so select sampling could evaluate exposure potential in addition to recontamination.

Report prepared by: Scott Clardy and Gale Carlson, Missouri Department of Health and Senior Services

Attachments: Figure 1 - Site Map
Figure 2 - Site Map

References

1. Missouri Department of Natural Resources. Preliminary assessment: Herculaneum Lead Smelter Site, Jefferson County, Missouri. Jefferson City, Missouri: Missouri Department of Natural Resources; 1999 March 30.

2. Agency for Toxic Substances and Disease Registry. Health consultation for Herculaneum Lead Smelter Site. Atlanta: US Department of Health and Human Services; 2001 Jul 13.

3. Agency for Toxic Substances and Disease Registry. Health consultation concerning blood lead results for 2001 calendar year, Herculaneum Lead Smelter Site, Herculaneum, Missouri. Atlanta: US Department of Health and Human Services; 2002 Feb 26.

4. Agency for Toxic Substances and Disease Registry. Health consultation concerning whether remedial actions are protective of public health, Herculaneum Lead Smelter Site, Herculaneum, Missouri. Atlanta: US Department of Health and Human Services; 2002 Apr 16.

5. US Environmental Protection Agency. Addendum to the quality assurance project plan for the Herculaneum lead smelter site, Herculaneum, MO. Kansas City, Kansas. 2002 Mar 19.

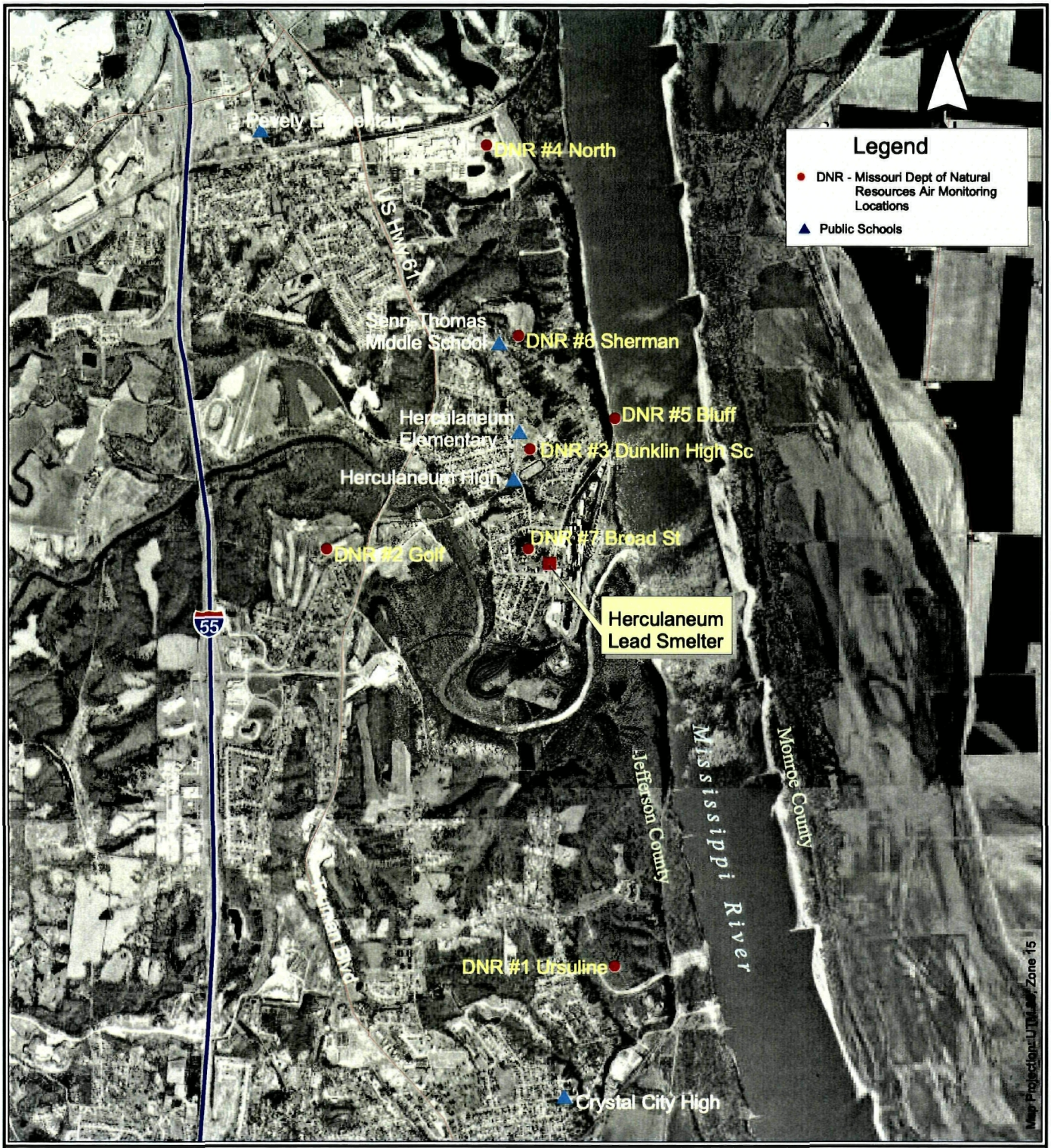
Certification

The Missouri Department of Health and Senior Services prepared this health consultation for the Herculaneum Lead Smelter Site, Public Health Review of the Addendum to the Quality Assurance Project Plan Concerning Interior Sampling, under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with the approved methodology and procedures at the time the health consultation was initiated.

Technical Project Officer, SPS, SSAB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.

Branch Chief, SSAB, DHAC, ATSDR



Herculaneum Lead Smelter

Herculaneum, Missouri

CERCLIS NO MOD006266373

VICINITY MAP

Jefferson County, MO

ATSDR GIS SALDS

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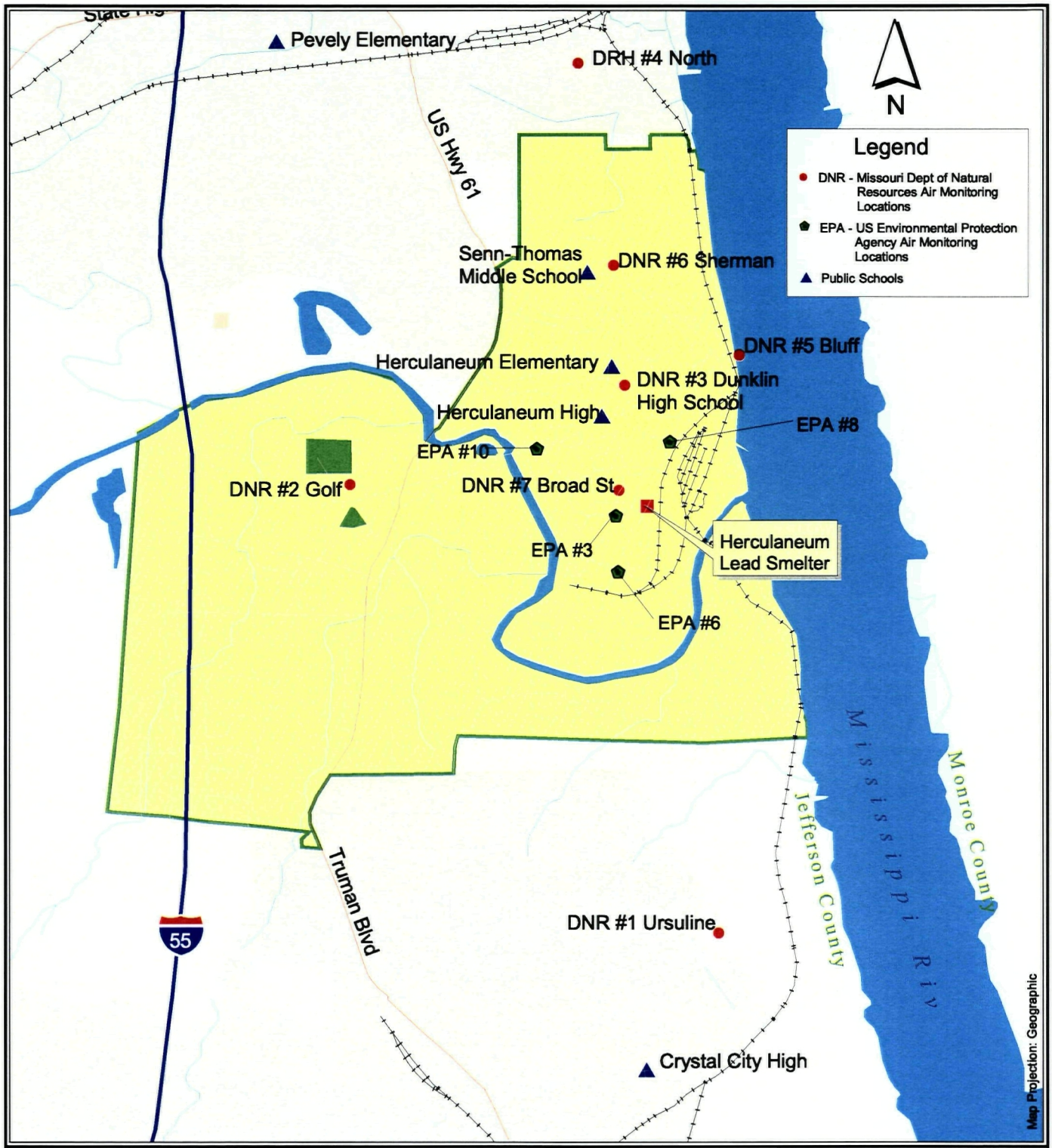

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